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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/573,568

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Akihiko Kubota

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EXAMINER

STIMPERT, PHILIP EARL

ART UNIT

PAPER NUMBER

3746

NOTIFICATION DATE

DELIVERY MODE

05/24/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/573,568	Applicant(s) KUBOTA ET AL.	
	Examiner Philip Stimpert	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 5, 6 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oshima et al. (US 5,816,783) in view of Fujikawa et al. (US 4,628,876).

3. Regarding claim 5, Oshima et al. teach a reciprocating compressor (see Fig. 2) comprising a hermetic container (10), a compressing element (12) accommodated in the hermetic container and compressing refrigerant gas (see abstract), the compressing element including a crankshaft (1) with a main shaft (1) and an eccentric section (1a) having respective axes, a block (4) forming a cylindrical cylinder (4a), a piston (2) reciprocating in the cylinder, a connecting rod (2c) connecting the eccentric section to the piston, and a balancing weight (indicated at 1, in Fig. 6A) which would balance vibrations produced by the piston and connecting rod. Oshima et al. also teach that the cylinder (4) is offset (see E in Fig. 6A) such that an axis line of the cylinder and an axis line of the main shaft do not cross each other. Oshima et al. do not teach that the balancing weight is deviated from a position exactly opposite the eccentric section axis. Fujikawa et al. teach an engine balancing system for a single cylinder engine with an offset between the axes of the drive shaft and cylinder (Fig. 7). Fujikawa et al. teach that this system includes a primary balancing weight and a counterbalancing weight

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having a center of gravity (C_1) that deviates a suitable distance from diametrically opposite the crank pin (15, see col. 4, ln. 48-62). Fujikawa et al. teach that this arrangement "is capable of lowering the vibromotive force acting in the direction of the center line of the cylinder to the same level as that prevailing in the engine" (col. 5, ln. 29-32). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the balancing system of Fujikawa et al. for that of Oshima et al., in order to reduce the vibromotive forces thereof.

4. Regarding claim 6, Fujikawa et al. shows the piston in essentially top dead center position, and shows that the center of gravity of the balancing weight (C_1) is offset from the cylinder axis but not beyond a plane (perpendicular to the page) that includes the main shaft axis (O_1) and is parallel with the cylinder access.

5. Regarding claim 9, Oshima et al. teach that the crankshaft is generally vertical (Fig. 2).

6. Regarding claim 10, Fujikawa et al. teach that the center of gravity of the balancing weight, the eccentric section axis, and the main shaft axis are not displaceable with respect to each other.

7. Regarding claim 11, Fujikawa et al. teach that balancing weight is provided such that the crankshaft and piston of Oshima et al. and the balancing weight (C_1) are arranged such that throughout reciprocation of the piston the eccentric axis (15), location opposite the eccentric axis (B_1) and counter weight center of gravity are arranged in that order (see Fig. 7, and direction of rotation A_1). This arrangement results in the location trailing the center of gravity by nearly 360° .

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8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oshima et al. in view of Fujikawa et al. and Musso et al. (US 6,695,973).

9. Oshima et al. and Fujikawa et al. substantially teach the limitations of claim 1 from which claim 3 depends, as discussed above. Oshima et al. do not teach the use of R600a as a refrigerant. Musso et al. teach several refrigerant gases, including R600a (or isobutane, see entries E and F in the table in col. 3). Musso et al. also teach that "isobutene is usually a commercial product which can contain up to 10% of n-butane," (col. 3, ln. 33-34) and that the use of such materials results in the advantageous reduction of wear in a compressor (col 4, ln. 9-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use R600a as a refrigerant in the compressor of Oshima et al. in order to reduce wear in the compressor.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oshima et al. in view of Fujikawa et al. and Hayasha et al. (US 5,506,486).

11. Oshima et al. and Fujikawa et al. substantially teach the limitations of claim 1 from which claim 4 depends, as discussed above. Oshima et al. also teach that the compressor is driven by an electric motor (see abstract). Oshima et al. do not teach that the crankshaft is driven by an inverter operating at a frequency not greater than a commercial power frequency. Hayasha et al. teach a control apparatus for a compressor, and in particular teach an inverter (see abstract) used to drive a shaft (220). Hayasha et al. also teach a range of frequencies (Fig. 3) output by the inverter. One of ordinary skill would appreciate that these frequencies are below the supply

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frequency (usually 60 Hz in America, see col. 10, ln. 35 for example showing cognizance of that fact by Hayasha et al.). Finally, Hayasha et al. teach that optimum efficiencies are obtained by the motor at such frequencies (col. 4, ln. 11-29). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use an inverter to drive the shaft of Oshima et al. at a frequency lower than the commercial power frequency as taught by Hayasha et al., in order to obtain optimum compressor efficiencies.

Response to Arguments

12. Applicant's arguments filed 15 Mar 10 have been fully considered but they are not persuasive.

13. With respect to claim 1, the applicant argues that the phrase "deviated, in a rotating direction of the main shaft" precludes the arrangement taught by Fujikawa et al. The examiner disagrees. The language as it stands is subject to at least two interpretations which read on the counterweight of Fujikawa et al. First, the claimed deviation may be either positive or negative, i.e. a trailing position is just as much a "deviation" as a leading one. Second, even if direction were required by the claim language, the position shown by Fujikawa is deviated in that direction, by nearly 360°. Since this still results in a position that is "substantially opposite to said eccentric section axis" as claimed, the language of claim 1 appears to read on a combination of Oshima et al. and Fujikawa et al.

14. Regarding newly presented claim 11, the ordering language is considered satisfied in that the recited locations will pass a given point set at the circumference of

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the circle in which they rotate in the specified order. And as above, the cyclical nature of a rotating circle falls into the trailing language of the claim.

15. In light of the foregoing, the obviousness rejection over Oshima et al. in view of Fujikawa et al. is maintained.

Conclusion

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip Stimpert whose telephone number is (571)270-1890. The examiner can normally be reached on Mon-Fri 7:30AM-4:00PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
Unit 3746

/P. S./
Examiner, Art Unit 3746
10 May 2010